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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,155	02/11/2004	Arlie R. Conner	59526US002	3097
32692	7590	11/02/2005	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY			LE, KHANH H	
PO BOX 33427			ART UNIT	
ST. PAUL, MN 55133-3427			PAPER NUMBER	
			2875	

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

A.B

Office Action Summary	Application No. 10/776,155	Applicant(s) CONNER, ARLIE R.	
	Examiner Khanh H. Le	Art Unit 2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>5/13/04, 5/20/05, 9/30/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the image-forming device having a plurality of mirrors in claim 18 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

The drawings are objected to under 37 CFR 1.83(a) because they fail to show a plurality of mirrors rotatable about a pivot axis as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended". If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet"

or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1- 9 and 11-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Serizawa et al. (US Patent No. 4,733,335).

4. With respect to claim 1, Serizawa discloses a light source module having an emitter that has a light-emitting surface (Fig. 8, item 111) and a pyramid collector (157) mounted onto the emitter over the emitting surface. The pyramid collector having a proximal end (unnumbered) facing the emitting surface and a distal end (unnumbered) facing away from the emitting surface.

5. With respect to claim 2, Serizawa discloses the proximal end of the pyramid collector is in contact with the light-emitting surface (Fig. 12).

6. With respect to claim 3, Serizawa discloses the proximal end of the pyramid collector has dimensions and shape that are approximately the same as dimensions and shape of the emitting surface (Fig. 12).

7. With respect to claims 4, and 5, Serizawa discloses the proximal end has a generally square shape and a distal end has a generally square shape (Fig. 7), or similarly, a generally rectangular shape.

8. With respect to claim 6, Serizawa discloses the proximal end of the pyramid collector is fitted around the emitting surface (Fig. 12).

9. With respect to claim 7, Serizawa discloses the light source module having a straight rectangular pipe section disposed adjacent to the distal end of the pyramid collector (Fig. 7, item 206).

10. With respect to claim 8, Serizawa discloses the light source module having a dome portion (Fig. 7, item 223).

11. With respect to claim 9, Serizawa discloses the light source further having a straight pipe portion disposed between the dome portion and the pyramid collector (Fig. 7, item 206).

12. With respect to claim 11, Serizawa discloses the distal end of the pyramid collector has a generally pincushioned configuration (Fig. 7).
13. With respect to claim 12, it is inherent, given the arrangement, that the pyramid collector collects at least about 70 percent of light emitted by the emitter.
14. With respect to claim 13, Serizawa discloses the distance between the proximal and distal ends of the pyramid collector is about 3 to 5 times longer than the largest diagonal of its distal end (if the minimum width of the distal end is 4.0 mm and the maximum length of the side is 18.0 mm, Col. 4, lines 50-52).
15. Claims 16, 17, 19, 21-27, 31, and 35-43 are rejected under 35 U.S.C. 102(b) as being anticipated by Tiao et al. (US Patent No. 6,318,863 B1).
16. With respect to claim 16, Tiao discloses an illumination system (Fig. 10) having a plurality of light source modules (1000a-c). Each light source module (Fig. 9B) has an emitter (902) that has a light-emitting surface (unnumbered) and a pyramid collector (912) mounted onto the emitter over the emitting surface, each pyramid collector having a proximal end (912a) facing the emitting surface and a distal end (912b) facing away from the emitting surface. The illumination system also have an illumination target (960), and a system of optical elements (920, 930, 940, and 950) disposed between the at least one light source module and the illumination target.

17. With respect to claim 17, Tiao discloses the plurality of the light source modules is disposed in an array within a non-radially symmetrical aperture (Fig. 2B).

18. With respect to claim 19, Tiao discloses the light source modules (Fig. 3B, item 300) and the system of optical elements (Fig. 3B, items 320, 322, 324, 326, and 330) are configured to form a plurality of channels aimed substantially into the illumination target (340).

19. With respect to claims 21, 22, and 25, Tiao discloses the proximal end of each pyramid collector closely in connecting with each of the light emitting modules 202 so that the light emitted from each of the light emitting module 202 is collected by corresponding taper light pipe" (Col. 3, lines 11-15).

20. With respect to claims 23, 24, 35, and 36, Tiao discloses the proximal end of each pyramid collector has a generally square shape and a distal end has a generally square shape, where substantial square also have the same meaning as substantially rectangular or rectangular shape (Fig. 1A-B, and Col. 5, lines 43-45).

21. With respect to claim 26, Tiao discloses light source module having a straight rectangular pipe section (Fig. 4A, item 420) disposed adjacent to the distal end (412b) of each pyramid collector (412).

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22. With respect to claim 27, Tiao discloses each of the each light source module (Fig. 9B, item 902) have a dome portion (item 920).

23. With respect to claim 31, it is inherent, given the arrangement, that the pyramid collector collects at least about 70 percent of light emitted by the emitter the pyramid collector is mounted on.

24. With respect to claim 37, Tiao discloses the system of optical elements is configured to image the distal end (Fig. 9B, 912b)) of each pyramid collector (912) onto the illumination target (960).

25. With respect to claims 38-40, Tiao discloses the images of the emitting surfaces are closely packed, overlapped, and substantially superimposed to form an illumination patch and the illumination patch substantially filled the illumination target (Fig. 9B, Col. 3 lines 41-43).

26. With respect to claim 41, Tiao discloses the shape of at least one of the distal ends of the pyramid collectors substantially matches a shape of the illumination target (Fig. 1A-B).

27. With respect to claims 42-43, Tiao discloses the shape of the illumination target is substantially square (Fig. 1A-B), where substantial square also have the same meaning as substantially rectangular.

Claim Rejections - 35 USC § 103

28. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

29. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Serizawa et al. (US Patent No. 4,733,355) in view of Yasumoto et al. (US Patent No. 4,941,072).

30. With respect to claim 10, Serizawa teaches the light source having a lens member that has a flange but does not teach the flange having the shape of a disk.

Yasumoto teaches a light source having a lens (Fig. 3, item 4) with a disk shaped flange (44) disposed between the dome portion and the pyramid collector for the frame to hold the lens in place.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make a lens having a flange with a disk shaped so that the flange will be hold by the frame to keep the lens in place.

31. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Serizawa et al. (US Patent No. 4,733,355) in view of Tai et al. (US Patent No. 5,506,929).

32. With respect to claims 14 and 15, Serizawa does not teach the pyramid collector has sides that taper from about 2 to 6 degrees, and no more than about 10 degrees from the distal to the proximal end.

Tai teaches the pyramid collector having sides that taper about 8 degrees will help to collimate light into a desired divergence range by reduce the divergence angle of the entry light ray (Col. 6, lines 43-52).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the pyramid collector having sides that taper about 8 degrees as taught by Tai in the pyramid collector of Serizawa so that the pyramid collector will help to collimate light into a desired divergence range by reducing the divergence angle of the entry light ray.

33. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tiao et al. (US Patent No. 6,318,863 B1) in view of McClelland et al. (US Patent No. 6,201,629 B1).

34. With respect to claim 18, Tiao teaches an illumination system having a light valve such as an LCD as the image-forming device but does not teach the light valve having a plurality of mirrors rotatable about a pivot axis as the image-forming device.

McClelland teaches a torsional micro-mechanical mirror system, a type of light valve, that is useful for video display systems since it is compact in size and can produce high resolution images at rapid frame rates, having a mirror (Fig. 1, item 3) that is rotatable about a pivot axis (Fig. 2A, item 7). The aperture of the mirror has a long dimension and a short dimension (Fig.3) and is oriented so that the long dimension is aligned with the pivot axis of the mirrors of the image-forming device.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the LCD light valve of Tiao with the torsional micro-mechanical mirror system of McClelland so that the size of the image generator of Tiao can be reduced, and produce high resolution images at rapid frame rates.

35. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tiao et al. (US Patent No. 6,318,863 B1) in view of Anderson (US Patent No. 5,997,150).

36. With respect to claim 20, Tiao teaches the light source modules disposed on a flat substrate (Fig. 9B, item 200) but does not teach the light source modules disposed tangentially to and along a spherical surface.

Anderson shows LED's are mounted tangentially to and along a spherical surface in figure 6 and figure 7, in order to reduce chromatic beam distortion from LEDs

at the edges of the array. The light from each LED intersects and focuses at a common focal point F (Col. 6, lines 12-25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to mount the LEDs such that the light from each LED intersects and focuses at a common focal point as Anderson's illumination system in the illumination system of Tiao so that chromatic beam distortion from LEDs at the edges of the array can be reduced from Tiao's illumination system.

37. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tiao et al. (US Patent No. 6,318,863 B1) in view of Yasumoto et al. (US Patent No. 4,941,072).

38. With respect to claim 28, Tiao teaches the light source module having a lens at the distal end of a pyramid but does not teach the light source further having a straight pipe portion disposed between the lens portion and the pyramid.

Yasumoto teaches the light source module (Fig. 4) having a straight pipe portion (45) disposed between the lens portion (4) and the pyramid (unnumbered). The straight pipe portion allows the lens to rest on the pyramid to maintain desired optical characteristics for a long time (Col. 2 line 68 - Col. 3, line 1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a straight pipe portion to the lens portion of the light source as taught by Yasumoto in the light source of Tiao so that the lens in the light

source of Tiao can rest on the pyramid and maintain the desire optical characteristics for a long time.

39. With respect to claim 29, Tiao teaches the light source having a lens member that has a flange but does not teach the flange having the shape of a disk.

Yasumoto teaches a light source having a lens (Fig. 3, item 4) with a disk shaped flange (44) disposed between the dome portion and the pyramid collector for the frame to hold the lens in place.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make a lens having a flange with a disk shaped so that the flange will be hold by the frame to keep the lens in place.

40. Claims 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tiao et al. (US Patent No. 6,318,863 B1) in view of Serizawa et al. (US Patent No. 4,733,335).

41. With respect to claim 30, Tiao teaches the distal end of the pyramids collector is facing a light pipe but does not teach the distal end of the pyramid is facing a condenser lens.

Serizawa teaches the distal end of the pyramid collectors is facing a lens member (Fig. 7, item 206) and the lens member consists of condenser lenses (223) having a generally pincushioned configuration (Fig. 7). The condenser lenses

effectively convert the light emitting diodes from point light to planar light sources (Col 4 line 68 to Col. 5 line 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the condenser lenses having a generally pincushioned configuration as taught by Serizawa to the pyramid collectors of Tiao so that the pyramid collectors of Tiao can effectively convert the light emitting diodes from point light to planar light sources.

42. With respect to claim 32, Tiao is silent about the size of the pyramid collector.

Serizawa teaches the diameter of the lens is substantially equal the diameter of the light emitting diode, and the length of the pyramid collector should be long enough to cover the length of the light emitting diode (minimum 4mm) but not too long (more than 18mm) since it would be more difficult to mold the condenser lens (Col. 4 lines 52-59). Therefore, Serizawa teaches the distance between the proximal and distal ends of the pyramid collector is about 3 to 5 times longer than the largest diagonal of that pyramid collector's distal end (if the minimum width of the distal end is 4.0 mm and the maximum length of the side is 18.0 mm, Col. 4, lines 50-52).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the pyramid collector with the distance between the proximal and distal ends of the pyramid collector is about 3 to 5 times longer than the largest diagonal of that pyramid collectors distal end as taught by Serizawa for the

pyramid collector of Tiao so that Tiao would not have a problem of molding the condenser lens.

43. Claims 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tiao et al. (US Patent No. 6,318,863 B1) in view of Tai et al. (US Patent No. 4,733,335).

44. With respect to claims 33 and 34, Tiao does not teach the pyramid collector has sides that taper from about 2 to 6 degrees, and no more than about 10 degrees from the distal to the proximal ends.

Tai teaches the pyramid collector having sides that taper about 8 degrees will help to collimate light into a desired divergence range by reduce the divergence angle of the entry light ray (Col. 6, lines 43-52).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the pyramid collector having sides that taper about 8 degrees as taught by Tai in the pyramid collector of Tiao so that the pyramid collector will help to collimate light into a desired divergence range by reducing the divergence angle of the entry light ray.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lewis et al. (US Patent No. 5,902,033) discloses a projector

system having a tapered light pipe, Nichols et. Al. (US Patent No. 4,767,172) discloses an LED array, Gardner et al. (US Patent No. 5,001,609) discloses a light source having a tapered housing and dome shaped lens, Handschy et al. (US Patent No. 6,038,005) discloses optics and light source arrangement in a projection system.

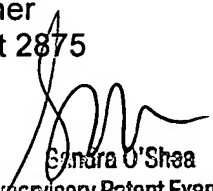
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh H. Le whose telephone number is (571) 272-8325. The examiner can normally be reached on Monday - Friday, 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Renee Luebke can be reached on (571) 272-2009. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KHL

Khanh H. Le
Examiner
Art Unit 2875



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